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NESDIS Publications

[A 1/4° spatial resolution daily sea surface temperature climatology based on a blended satellite and *in situ* analysis](#)

Journal of Climate

OTHER REPORTS, BOOK CHAPTERS, AND INTERNAL PUBLICATIONS

NOS Publications

[Coastal ecosystem assessment of Chesapeake Bay watersheds: a story of three rivers - the Corsica, Magothy and Rhode](#)

NCCOS Technical Memo

[Ecological condition of coastal ocean waters along the U.S. continental shelf of Northeastern Gulf of Mexico: 2010](#)

NCCOS Technical Memo





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HIGHLIGHTED ARTICLES

Incremental fishing gear modifications fail to significantly reduce large whale serious injury rates

Endangered Species Research (2.259)

R. M. Pace, T. V. N. Cole, and A. G. Henry (NMFS/NEFSC)

- The authors found no evidence to support even modest decreases in whale entanglement mortality following implementation of commercial fishing gear modifications as a result of the Atlantic Large Whale Take Reduction Plan (ALWTRP) over the period 1998 to 2009.
- Evidence for mortality and serious injury associated with whale entanglement in fishing gears is developed from haphazard detections (as opposed to a designed sampling strategy) which are biased low, and detections are infrequent (2-10 detected entanglements per year for right whales).
- As a measure of the near-term effectiveness of management actions, counts of carcasses from this haphazard sampling against PBR is an inappropriate measure because it lacks the sensitivity needed to evaluate the impact of management actions.

A major and immediate goal of the US Marine Mammal Protection Act is the reduction of incidental marine mammal mortality associated with commercial fishing operations. Under the articles of the Act, the Atlantic Large Whale Take Reduction Plan (ALWTRP) was developed and implemented to reduce entanglement mortality of North Atlantic right whales *Eubalaena glacialis*, Gulf of Maine humpback whales *Megaptera novaeangliae*, and western North Atlantic fin whales *Balaenoptera physalus* by requiring modifications to commercial fishing gear (*i.e.* pots and sink gillnets). Although they undercount the number of entanglements, counts of detected incidents of entanglements and entanglement-related mortality are the primary index used to measure entanglement mortality. We analyzed the annual counts of large whale entanglements — including serious injuries and mortalities attributed to entanglements — to evaluate the effectiveness of the ALWTRP during the period 1999-2009. The annual





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number of mortality events related to fishing gear entanglements (including serious injuries) averaged 2.5 for right whales, 6.5 for humpback whales, 0.6 for fin whales, and 2.4 for minke whales *Balaenoptera acutorostrata*. Annual entanglement rates increased during the study period, but evidence for increased rates of entanglement-related mortality was equivocal. No significant changes occurred in waiting time (the number of days between entanglement events) in response to any management measures implemented to reduce large whale mortalities during 1998-2009, implying that these measures were generally ineffective in abating whale deaths from fishing gear entanglement.

Accepted: October 2014

<http://www.int-res.com/prepress/n00635.html>

Projecting future change in distributions of pelagic fish species along the west coast of Northeast Pacific Shelf areas

Progress in Oceanography (3.986)

W. W. L. Cheung, **R. D. Brodeur** (NMFS/NWFSC), T. A. Okey, and D. Pauly

- Using results from a dynamic bioclimatic envelope model, the authors developed quantitatively explicit hypotheses of possible changes in the distributions and assembly of fishes in the coastal epipelagic zone commonly captured over Northeast Pacific Ocean continental shelves.
- These hypotheses include poleward migration of species, increased species invasions, and shifts to more warm-water dominant communities by 2050 if the current trajectory of greenhouse gas emissions continues.
- Projections indicate that impacts will be most intensive in the northern subareas, such as the Gulf of Alaska and the Bering Sea, but changes in the southern part of the study area may have been underestimated due to the limited set of species examined.

Marine life is being affected by changes in ocean conditions resulting from changes in climate and chemistry triggered by combustion of fossil fuels. Shifting spatial distributions of fish species is a major observed and predicted impact of these oceanographic changes, and such





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shifts may modify fish community structure considerably in particular locations and regions. This paper aims to project future range shifts of pelagic marine fish of the Northeast Pacific shelf seas by 2050 relative to the present. The Authors combined published data, expert knowledge, and pelagic fish survey data to predict current species distribution ranges of 28 fish species of the Northeast Pacific shelf seas that occur in the epipelagic zone and are well-represented in pelagic fish surveys. These represent a wide spectrum of sub-tropical to sub-polar species, with a wide range of life history characteristics. Using projected ocean condition changes from three different Earth System Models, the Authors simulated changes in the spatial distribution of each species. Results show that Northeast Pacific shelf seas may undergo considerable changes in the structure of its pelagic marine communities by mid-21st century. Ensembles of model projections suggest that the distribution centroids of the studied species are expected to shift poleward at an average rate of 30.1 ± 2.34 (S.E.) km decade⁻¹ under the SRES A2 scenario from 2000 to 2050. The projected species range shifts result in a high rate of range expansion of this group of species into the Gulf of Alaska and the Bering Sea. Rate of range contraction of these species is highest at the Aleutian Islands, and in the California Current Large Marine Ecosystem. The Authors also predicted increasing dominance of warmer water species in all regions. The projected changes in species assemblages may have large ecological and socio-economic implications through mismatches of co-evolved species, unexpected trophic effects, and shifts of fishing grounds. These results provide hypotheses of climate change impacts that can be tested using data collected by monitoring programmes in the region.

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<http://www.sciencedirect.com/science/article/pii/S0079661114001505>





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ADDITIONAL ARTICLES

NWS Publications

Evaluation of sounding-derived thermodynamic and wind-related parameters associated with large hail events

Electronic Journal of Severe Storms Meteorology

A. W. Johnson and **K. E. Sudgen** (NWS)

- Real hail event data were combined with fields extracted from Rapid Update Cycle (RUC) model analysis to create a parameter-based climatology for hail events.
- Once the environment became favorable for rotating updrafts, the role of traditional supercell-based parameters to forecast the production of extremely large hail diminished considerably.
- Extensive modeling and study of storm microphysics may be needed to further address the question of forecasting sizes for very large hail.

Severe convective hailstorms remain one of the most frequent yet challenging weather hazards across the United States. Studies evaluating the ability of various environmental indices to differentiate lower-end severe hail (< 1.5 in.) from significant hail (> 2.0 in.) prior to storm formation are limited and typically overlap very little with microphysical-based research. To bridge this gap, this study built a database of 520 hail events of varying sizes with cases subsequently binned into one of four hail diameter ranges. For each event in the database, various thermodynamic and wind-related fields were extracted from Rapid Update Cycle (RUC) model analysis to create a parameter-based climatology for hail events. The authors found that once the environment became favorable for rotating updrafts, the role of traditional supercell-based parameters such as Shear0-6-km to forecast the production of extremely large hail (≥ 3.5 in.) diminished considerably. In environments favorable for extremely large hail, parameters used to measure precipitation efficiency and/or updraft strength/duration may be more valuable in forecasting maximum hail size.

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NMFS Publications

Patterns of river influence and connectivity among subbasins of Puget Sound, with application to bacterial and nutrient loading

Estuaries and Coasts (2.245)

N. S. Banas, L. Conway-Cranos, D. A. Sutherland, P. MacCready, **P. M. Kiffney**, and **M. Plummer** (NMFS/NWFSC)

- Model results indicate freshwater contributions from rivers entering Puget Sound are highly non local in spring and summer with distant large rivers (Skagit, Fraser) accounting for a large fraction of total freshwater.
- However, bacterial and nutrient loadings associated with major Puget Sound rivers are mostly confined to areas near river mouths.
- Exceptions to this localized loading of pathogens and nutrients were observed in northern Puget Sound (Bellingham Bay, Samish River) where the Fraser may rival local river sources as a pathogen source.

Puget Sound is an estuarine inland sea fed by 14 major rivers and also strongly influenced by the nearby Fraser River. A comprehensive, particle-based reanalysis of an existing circulation model was used to map the area of influence of each of these rivers over a typical seasonal cycle. Each of the 131,000 particles released in the 15 rivers was associated with a freshwater volume, a nutrient load, and a fecal coliform load based on statistics from 10 years of Washington Department of Ecology monitoring data. Simple assumptions regarding mortality and nutrient utilization/export rates were used to estimate the decrease in bacterial and nutrient load as individual parcels of river water age. Reconstructions of basin-scale volume fluxes and salinities from the particle inventory provide consistency checks on the particle calculation, according to methods suitable for error analysis in a wide range of particle-based estuarine residence time studies. Results suggest that river contributions to total freshwater content in Puget Sound are highly nonlocal in spring and summer, with distant, large rivers (the Fraser and Skagit) accounting for a large fraction of total freshwater. However, bacterial mortality and





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nutrient export rates are relatively fast compared with transport timescales, and so significant loadings associated with major rivers are in most cases only seen close to river mouths. One notable exception is fecal coliform concentration in Bellingham Bay and Samish Bay, which lie north of Puget Sound proper; there, it appears that the Fraser River may rival local rivers (the Samish and Nooksack) as a pathogen source, with the much higher flow volume of the Fraser compensating for its remoteness.

Expected Publication Date: Fall 2014

Increasing juvenile coho salmon densities during early recolonization have not affected resident coastal cutthroat trout growth, movement, or survival

North American Journal of Fisheries Management (1.110)

T. W. Buehrens, **P. M. Kiffney**, **G. R. Pess**, **T. R. Bennett**, **S. M. Naman**, **G. T. Brooks**, and T. Quinn (NMFS/NWFSC)

- Rapid recolonization of coho salmon following installation of a fish ladder provided an opportunity to measure the effect of increasing coho salmon densities on resident coastal cutthroat trout.
- Juvenile coho salmon rapidly colonized newly available habitat and reached densities observed in established populations.
- Although coho densities increased 8-fold over the course of the study, there was no evidence that this increase affected growth, movement or survival of native Coastal Cutthroat trout.

The process of salmon colonization in the upper Cedar River and Rock Creek, Washington, following the installation of a fish ladder at Landsburg Diversion Dam in 2003, offered an opportunity to measure the effects of interspecific interactions on the dynamics of resident fish populations. Rapid recolonization by coho salmon (*Oncorhynchus kisutch*) provided a natural experiment to determine the influence of coho salmon densities on the growth, movement, and survival of resident coastal cutthroat trout (*O. clarkii clarkii*) relative to other abiotic and biotic factors such as habitat quality, environmental conditions, and conspecific density. During 14





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seasonal sampling events from 2005 to 2009, we PIT-tagged 1,851 and recaptured 394 cutthroat trout in Rock Creek, collected habitat data, enumerated fish populations, and monitored fish movements with PIT tag antenna arrays. Trout growth varied significantly among seasons and was greatest during spring and early summer. Mean juvenile coho salmon density in summer and fall increased eightfold from 0.04 to 0.32 and from 0.08 to 0.68 fish/m², respectively, approaching levels seen in established populations, but did not explain variation in trout growth, movement, or survival. Summer growth of trout parr and fry were both negatively correlated with the density of conspecifics but were positively correlated with total salmonid density. Additionally, trout parr growth was positively correlated with stream discharge, whereas trout fry growth was negatively correlated with initial size and declined during the course of the study. However, abiotic and biotic explanatory variables accounted for little of the variation in trout growth, movement, and survival, suggesting that a great deal of individual variation exists. Overall, trout were largely unaffected by coho salmon colonists despite large increases in juvenile coho salmon density, though this may change if salmon populations continue to grow. Accepted: June 2014

Linking resource availability and habitat structure to stream organisms: an experimental and observational assessment
Ecosphere (2.595)

P. M. Kiffney, E. Buhle, S. M. Naman, G. R. Pess, and R. Klett (NMFS/NWFSC)

- Experimental addition of marine nutrients via chinook salmon tissue had strong effects on growth and body size of juvenile coho salmon via bottom-up effects on prey items.
- Mark-recapture field study also supported the hypothesis that factors limiting prey availability determine summer growth of juvenile coho, but also indicated local coho density had a strong negative effect on coho growth.
- Physical habitat structure may modify species interactions through its effect on fish movements.





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An experiment and a mark-recapture field study of juvenile coho salmon (*Oncorhynchus kisutch*) were conducted to identify controls of key energy flow chains in river food webs. In the small-scale experiment, we investigated the individual and interactive effects of physical habitat structure (PHS) as small wood and resource availability (tissue of adult Chinook salmon, *O. tshawytscha*) on nutrients, algae, invertebrates, and fish predators including juvenile coho. In the field, we quantified the effects of natural variation in prey availability (invertebrate drift biomass), PHS (wood), and local fish density on summer growth of juvenile coho across multiple stream reaches. Adding salmon tissue to experimental channels resulted in strong bottom-up effects on select invertebrates including increased population biomass of chironomids and baetids, the numerically dominant invertebrates, and faster growth of juvenile coho. We link the enhanced growth of coho to chironomid productivity: for instance, adult chironomid flux was 4.3x higher and coho consumption of these animals 3x higher in salmon-subsidized channels. PHS in experimental channels was associated with reduced algal biomass, potentially in response to increased invertebrate consumption, and invertebrate flux or export. The field study revealed coho growth was negatively related to PHS and total fish density and positively related to Diptera drift biomass; however, the effects of fish density and drift biomass on coho growth were relatively weak. The field study also indicated that prey resource availability and coho growth were associated with differences in canopy cover, with prey biomass and coho growth 2– 4x higher in reaches receiving more sunlight. As in the experiment, coho in natural stream reaches predominantly fed on adult chironomids and other Diptera, indicating that these taxa and life-stages are a key link between the benthic food web and mobile vertebrate predators. Our study showed that bottom-up processes initiated by salmon subsidies and possibly light flux determined key trophic interactions in the Cedar River food web. Moreover, we speculate that PHS may modify some of these interactions indirectly through its effects on the movement of organisms through the environment.

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Whale killers: prevalence and ecological implications of killer whale predation on humpback whale calves off Western Australia

Marine Mammal Science (1.82)

R. L. Pitman, J. A. Totterdell, H. Fearnbach, L. T. Balance, J. W. Durban, and H. Kemps (NMFS/SWFSC)

- This paper provides the first published eyewitness accounts of killer whale (*Orcinus orca*) predation on humpback whales (*Megaptera novaeangliae*) and establishes that such attacks occur on newborn calves on a regular basis.
- This paper documents vigorous and successful defense of humpback calves by the escorts against killer whales on numerous occasions.
- The recovery of this humpback whale population from commercial whaling to abundances higher than pre-exploitation, and increasing accounts of killer whale predation, indicate that top-down forcing may play a more important role in this and other ecosystems where large whales are recovering from direct exploitation.

Reports of killer whales (*Orcinus orca*) preying on large whales have been relatively rare, and the ecological significance of these attacks is controversial. The Authors provide the first published eyewitness accounts of killer whale predation on humpback whales (*Megaptera novaeangliae*), based on reports and their own observations, from Western Australia (WA). Attacking killer whales included at least 19 individuals from 3 stable social groupings in a highly-connected local population; 22 separate attacks with known outcomes resulted in at least 14 (64%) kills of neonate humpbacks. The Authors satellite-tagged an adult female killer whale and followed her group on the water for 20.3 h over 6 separate days. During that time, they attacked 8 humpback calves, and from the 7 known outcomes, at least 3 calves (43%) were killed. Overall, these observations suggest that humpback calves are a predictable, plentiful, and readily-taken prey source for killer whales and scavenging sharks off WA for at least 5 mo/yr. Humpback “escorts” vigorously assisted mothers in protecting their calves from attacking killer whales (and a white shark *Carcharodon carcharias*). This expands the purported role of escorts





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in humpback whale social interactions, although it is not clear how this behavior is adaptive for the escorts.

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Diet variability of forage fishes in the Northern California Current System

Journal of Marine Systems (2.476)

A. D. Hill, E. A. Daly, and **R. D. Brodeur (NMFS/NWFSC)**

- Seasonal, annual, and interdecadal changes in forage fish diets were related to ocean conditions.
- Forage fish may be sensitive indicators of changing ocean conditions.
- Juvenile salmon exhibited little diet overlap with the dominant forage fishes.

As fisheries management shifts to an ecosystem-based approach, understanding energy pathways and trophic relationships in the Northern California Current (NCC) will become increasingly important for predictive modeling and understanding ecosystem response to changing ocean conditions. In the NCC, pelagic forage fishes are a critical link between seasonal and interannual variation in primary production and upper trophic groups. The Authors compared diets among dominant forage fish (sardines, anchovies, herring, and smelts) in the NCC collected in May and June of 2011 and 2012, and found high diet variability between and within species on seasonal and annual time scales, and also on decadal scales when compared to results of past studies conducted in the early 2000s. Prey composition for most forage fish in 2012 was principally composed of copepods, which differed from a preponderance of euphausiids found in the previous studies for cold-water ocean conditions. The Authors also examined diet overlap among these species and with co-occurring subyearling Chinook salmon. Forage fish that show plasticity in diet may be more adapted to ocean conditions of low productivity or anomalous prey fields. These findings highlight the variable and not well-understood connections between ocean conditions and energy pathways within the NCC.

Accepted: August 2014





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How variable is recruitment for marine fishes? A hierarchical model for testing life history theory

Canadian Journal of Fisheries and Aquatic Sciences (2.28)

J. T. Thorson (NMFS/NWFSC), O. Jensen, and E. Zipkin

- Researchers use data from >100 fish populations to estimate the magnitude and streakiness of variability in early-juvenile survival.
- They find support for a previous hypothesis that streaky juvenile survival will be associated with fishes that delay sexual maturity. Estimates can be of use to statistical models that are often employed to manage fish populations and fishing communities.

Research over the past hundred years has shown that survival of larval and juvenile fishes is highly variable, so that individuals of a few ages (which were born when conditions were favorable) will often compose the majority of a fish population. Recruitment often varies substantially even in the absence of changes in adult spawning biomass, and residual variability after accounting for stock-recruit relationship may have serial autocorrelation due to the environmental effects. However, the likely magnitude of variability and autocorrelation in recruitment has not been formally estimated. We therefore develop a hierarchical model for recruitment variability and autocorrelation, and apply it to data for 154 fish populations. Results are similar when using either Ricker and Beverton-Holt stock-recruit models, and show an average log-standard deviation of 0.67 for recruitment and an average autocorrelation of 0.49. Estimates differ substantially among taxonomic orders and stocks, and also support an hypothesized positive relationship between age at maturity and autocorrelation. Results can be used as a Bayesian prior for recruitment variability in models for data-poor stocks, and to distinguish recruitment from other process errors in models for data-rich stocks. Estimates can also be used in the design of future simulation model and management strategy evaluation, and in theoretical research regarding life history variation.

Acceptance date: 15 June 2014





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Towards a diverse conservation ethic

Nature (42.35)

H. Tallis and 158 authors, including **P. S. Levin (NMFS/NWFSC)**

- The article contends that the field of conservation science is essentially gender biased and sexist.

An age-old conflict around a seemingly simple question has resurfaced: Why do we conserve nature? Contention around this issue has come and gone many times, but in the last several years it has reappeared as an increasingly acrimonious debate between those who argue that nature should be protected for its own sake (intrinsic value) and those who argue that we must also save nature to help ourselves (instrumental value). The stakes? Nothing short of the future of conservation science, practice and policy. For such an incredibly important dialogue, we find the dominant voices unrepresentative of the field, and in need of redirection: those speaking out are overwhelmingly male, and their divisive arguments are no longer helping the field progress. In this note, we articulate the case for a more inclusive approach to conservation and more inclusive representation of scientists and practitioners. Women historically have been under-represented in environmental science faculty positions at universities and in conservation practice, as is the case in many other scientific fields. However, this disparity has been changing, with women now occupying more than half of leadership positions and more than 60% of new hires and interns in conservation non-governmental organizations in the United States. On the international stage, it has been encouraging to see women take leadership positions in some of the field's leading inter-governmental efforts, including the Executive Secretary for the Intergovernmental Platform on Biodiversity and Ecosystem Services and both vice-chairs of the Science Committee for Future Earth. This progress makes the lack of female voices in the debate about the core premise of our profession even more stark.

Accepted: October 2014





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Opportunistic acoustic telemetry platforms: lessons from the Gulf of Maine Fisheries (2.317)

G. S. Goulette, J. P. Hawkes, F. J. Kocik, J. P. Manning, P. A. Music, J. P. Wallinga, and G. B. Zydlewski (NMFS/NEFSC)

- Research footprints and information gains were increased significantly at minimal cost by using existing aquatic (marine, river, lake) infrastructure as platforms for research.

Biologists monitor animal behavior, habitat use, and survival through local telemetry projects. Migratory species cross these lines, connecting projects. Biologists can further these connections by expanding the area monitored, but this step is expensive. We evaluated three opportunistic platforms: 1) oceanographic buoys, 2) commercial fishing gear, and 3) drifters to test the feasibility of expanding coverage while minimizing costs. All Gulf of Maine platforms provided novel data, generating over 15,000 detections from animals released by 18 organizations. Performance was strong for buoys and commercial gear but low recovery hampered drifter utility; although, advances in real-time drifter communication should improve future efficacy. Opportunistic platforms proved to be a low-cost method that can benefit researchers across aquatic systems. Animals from other studies connected us with researchers fostering dialog and highlighted information gains from data sharing. Working with fishers and oceanographers also strengthens interdisciplinary and stakeholder communication and can increase overall public understanding and support.

Expected Publication Date: October 2014

North Atlantic right whale Eubalaena glacialis vocalization patterns in the central Gulf of Maine from October 2009 to October 2010

Endangered Species Research (2.259)

J. Bort, S. M. Van Parijs (NMFS/NEFSC), P. T. Stevick, E. Summers, and S. Todd

- This study confirms that North Atlantic right whales are present in the central Gulf of Maine for much longer time periods than was previously thought.





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The central Gulf of Maine was recently identified as a persistent wintering ground and potential mating ground for non-calving North Atlantic right whales based on aerial survey data. However, these surveys were limited by bad weather and light. Here we use passive acoustic monitoring to examine the long-term persistence of right whales in this area throughout a near continuous period from October 2009 through October 2010. Three archival marine acoustic recording units were deployed in the Outer Fall/central Gulf of Maine. These data were manually reviewed for right whale up-calls and gunshots to investigate seasonal and diel patterns. Up-calls and gunshots occurred seasonally, with the most calls recorded from October to January and fewer calls detected across February through July, increasing again in August through October. Up-calls were most frequent in November, and gunshots in December. There was a clear bimodal diel pattern in up-calls, with the majority of calls occurring between 04:00 through 08:00 and 13:00 through 22:00 h. There was a clear peak in diel distribution of gunshots, with the majority of calls occurring between 16:00 through 22:00 h. Our data demonstrate the continuous presence of right whales during winter months. The rate of gunshots during winter months in Outer Fall supports the hypothesis that male advertisement and/or mating behavior may be taking place in this region at that time.

Accepted: October 2014

NOS Publications

*The relationship between land use and emerging and legacy contaminants in an apex predator, the bottlenose dolphin (*Tursiops truncatus*), from two adjacent estuarine watersheds*

Environmental Research (3.951)

J. Adams, **T. Speakman**, **E. Zolman**, **G. Mitchum**, **E. Wirth**, G. D. Bossart, and **P. A. Fair** (NOS/NCCOS)

- Despite their close geographic proximity, significant differences in persistent organic contaminants were observed between dolphins from two adjacent coastal watersheds.





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- Results suggest watersheds may provide an important framework to examine impacts of anthropogenic and natural factors on resident marine mammals, such as bottlenose dolphins.

Persistent organohalogen contaminant (POCs) exposure is of concern in marine mammals due to the potential for adverse health effects. Studies have examined POCs in marine mammals on a regional scale; however, limited data exists on POC concentrations relative to land use and watersheds. The authors examined geographical variation of POC concentrations in bottlenose dolphins as it relates to land, and watershed, use. POC (PCBs, DDTs, and PBDEs) concentrations were measured in blubber of bottlenose dolphins (n= 40) sampled in estuarine waters near Charleston, SC. Photo-identification sighting histories were used to assess the dolphins' use of estuarine waters in two adjacent watersheds (Cooper Subbasin and Stono Subbasin) in the study area and to determine land use (developed, forested, agriculture, and wetland) associations. Dolphins with $\geq 75\%$ of their sightings in the Cooper Subbasin, which is characterized by a higher degree of developed land use, exhibited higher levels of PCBs, PBDEs, and total pesticides than those with $\geq 75\%$ of their sightings in the Stono Subbasin. Observed differences were significant for $\sum \text{PBDEs}$ and $\sum \text{DDTs} / \sum \text{PCBs}$ ratio. Significant positive correlations were observed between $\sum \text{PBDEs}$ and developed land use and between $\sum \text{DDTs} / \sum \text{PCBs}$ and wetland land use. A significant negative correlation was observed between $\sum \text{DDTs} / \sum \text{PCBs}$ and developed land use. Spatial pattern of emerging contaminant PBDEs and the $\sum \text{DDTs} / \sum \text{PCBs}$ detected in dolphin blubber varied significantly in adjacent watersheds and land use associations.

Accepted: September 2014





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NESDIS Publications

A 1/4° spatial resolution daily sea surface temperature climatology based on a blended satellite and in situ analysis

Journal of Climate (4.904)

V. F. Banzon (NESDIS/NCDC), R. W. Reynolds, D. Stokes (NWS/NCEP), and Y. Xue (NWS/NCEP)

- The new SST climatology is now available and offers better resolution along coastal and frontal areas than the lower resolution NCEP climatology.
- Slight differences between the two climatologies exist and may be amplified when some climate indices, based on SST anomalies, are generated using different climatologies.

A new SST climatological mean was constructed using the first thirty years (1982-2011) of the NOAA Daily Optimum Interpolation (OI) SST. The daily analysis blends *in situ* and satellite data on a 1/4° (~25 km) spatial grid. Use of an analysis allows computation of a climatological value for all ocean grid points, even those without observations. Comparisons were made with a monthly, 1° spatial resolution climatology produced at the National Centers for Environmental Prediction, computed primarily from the NOAA weekly OISST. Both climatologies were found to provide a good representation of major oceanic features and the annual temperature cycle. However, the daily climatology showed tighter gradients along western boundary currents and better resolution along coastlines. The two climatologies differed by over 0.6°C in high SST gradient regions, due to resolution differences. The two climatologies also differed at very high latitudes, where the sea-ice processing differed between the OISST products. In persistently cloudy areas, the new climatology was generally cooler by ~0.4°C, probably reflecting differences between the input satellite SSTs to the two analyses. Since the new climatology represents mean conditions at scales that match the daily analysis, it would be more appropriate for computing the corresponding daily anomalies.

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Available Online: <http://journals.ametsoc.org/doi/pdf/10.1175/JCLI-D-14-00293.1>





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OTHER REPORTS, BOOK CHAPTERS, AND INTERNAL PUBLICATIONS

NOS Publications

Coastal ecosystem assessment of Chesapeake Bay watersheds: A story of three rivers - the Corsica, Magothy and Rhode

NCCOS Technical Memo

A. Leight, J. Jacobs, L. Gonsalves, G. Messick, S. McLaughlin, J. Lewis, J. Brush, E. Daniels, M. Rhodes, L. Collier, and B. Wood (NOS/NCCOS)

- Differences in land use correspond to differences in aquatic habitat condition and organism health and there are tradeoffs between land development and aquatic ecosystem health.
- This study supports and enhances our understanding of the linkages between land use, coastal habitat condition and organism health. It provides evidence that some measures of organism health act as indicators of stress while others do not.

This assessment explored linkages between land use and aquatic ecosystem health. Three watersheds (Corsica, Magothy, and Rhode rivers) with variable dominant land-use patterns (agriculture, suburban/residential, and mixed-use, respectively) were examined. The health of each habitat was assessed using a suite of observations focused on water quality and the health of aquatic organisms. Standard water quality metrics such as dissolved oxygen concentration, dissolved nitrogen/phosphorous concentration and water clarity were measured. Organismal health parameters included metrics of fish and shellfish growth, disease prevalence and severity, fish abundance, and species diversity. By analyzing these indicators of ecosystem health and their relationship to human activities within the surrounding watershed, this assessment provides insight into the trade-offs between land development and aquatic ecosystem health. This information is necessary in order to strike a balance between supporting the needs of an ever increasing population and protecting the valuable ecosystem services that have benefited generations of Chesapeake Bay communities.

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Available Online:

<https://drive.google.com/a/noaa.gov/file/d/0B5DCrRbFXRrLTfP5SRkt4Z09XMEE/edit>

Ecological condition of coastal ocean waters along the U.S. Continental Shelf of Northeastern Gulf of Mexico: 2010

NCCOS Technical Memo

C. Cooksey, J. Hyland, M. H. Fulton, L. Balthis, E. Wirth, and T. Wade (NOS/NCCOS)

- Results of this post-DWH survey showed no evidence of oil in sediments at elevated levels known to pose risks to benthic infauna invertebrates based on other studies.
- Given this study's focus on offshore, shelf sediments at a distance of at least 30 nm away from the wellhead, these results do not preclude the possibility of impacts from the DWH spill on sediments deeper and more proximate to the wellhead, or to near-shore sediments, which may have been impacted by oil or other spill-related constituents through a range of other physical mechanisms.

This document provides an assessment of ecological condition, with an emphasis on soft-bottom habitats and overlying waters, along the U.S. continental shelf in the northeastern Gulf of Mexico, from Anclote Key on the west coast of Florida to the Mississippi River Delta. Sampling was conducted in August 2010, approximately one month after the Deepwater Horizon Wellhead was capped. The project was a collaborative effort by the National Oceanic and Atmospheric Administration (NOAA)/National Centers for Coastal Ocean Science (NCCOS), the U.S. Environmental Protection Agency (EPA), and Texas A&M University (TAMU). This project is part of a series of studies, similar in protocol and design to EPA's Environmental Monitoring and Assessment Program (EMAP) and subsequent National Coastal Assessment (NCA), which extend these prior efforts in estuaries and inland waters out to the coastal shelf, from navigable depths along the shoreline seaward to the shelf break (approximate 100 m depth contour). Results suggest that natural resources throughout these offshore (shelf) waters were generally (with some exceptions) in good condition based on the present sampling occasion and indicators. There was evidence of hypoxic effects at stations near the Mississippi





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delta in the vicinity of known seasonal hypoxic events. In addition, there were low yet detectable levels of several classes of contaminants including metals, PCBs, PBDEs, PAHs, and pesticides in sediments throughout the region, demonstrating that such substances are making their way to the offshore environment (albeit at low levels) and thus should continue to be monitored to help prevent growth of potential environmental risks to offshore resources and the services they provide.

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